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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/824,310

04/13/2004

Junko Yotani

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7590

07/09/2008

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EXAMINER

YANG, JIE

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/824,310	<b>Applicant(s)</b> YOTANI ET AL.	
	<b>Examiner</b> JIE YANG	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/22/2008 has been entered.

### ***Status of the Claims***

Claim 8 has been added as new claim, claim 1 has been amended from original claim, and claims 1-8 are pending in application.

### ***Status of the Previous Rejections***

Previous rejection of claims 1-7 under 35 U.S.C. 35 U.S.C. 112 first paragraph, as failing to comply with the written description requirement is withdrawn in view of the applicants' Argument/Remarks made in the amendment to the claims marked 2/29/2008.

Previous rejection of claims 1-7 under 35 U.S.C. 35 U.S.C. 112 second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regard as the invention is withdrawn in view of the

applicants' Argument/Remarks made in the amendment to the claims marked 2/29/2008.

Previous rejections of claims 1-7 under 35 U.S.C. 103(a) as obvious over US Patent publication US 2001/0028209 to Uemura et al. in view of US Patent publication US 2002/003463 to Shin et al and in further view of US Patent publication US 2004/0095050 to Liu et al are withdrawn in view of the applicants' Argument/Remarks made in the amendment to the claims marked 2/29/2008. However, upon further consideration, a new ground(s) of rejection is made as address following.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al (US 6,522,055 B2, thereafter, US'055) in view of Liu et al (US 7,064,474 B2, thereafter, US'474).

Regarding claim 1, US'055 teaches a method of manufacturing an electron-emitting source (Abstract, Col.1, lines 8-28, Fig.1-9, and Col.6, line 20 to Col.8, line 28 of US'055). US'055 teaches forming the cotton-like film, within the film, each

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nanotube fiber has one end connected to the surface of substrate and curled or entangled with other nanotube fibers (Col.3, lines 35-47 of US'055). US'055 further teaches electric field is applied uniformly over curled or entangled nanotube fibers to smooth its surface (Col.6, lines 1-19 of US'055). US'055 does not specify irradiating the film with a laser beam irradiation perpendicularly to the substrate. However, using a laser beam irradiating the nanotube in a manufacturing process of an electron-emitting device is a known technique. US'474 teaches a method to make a field emission device (entire document). US'474 teaches a laser beam could be used to open the tips and purify the carbon nanotubes (Col.1, line 50-Col.2, line 3 of US'474). US'474 teaches laser beam irradiation perpendicularly on the substrate (Fig.3, Col.4, line 50 to Col.5, line 3 of US'474), which reads on the laser beam irradiating process as recited in the instant claim. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply laser beam irradiation perpendicularly to the substrate as demonstrated in US'474 in the process of US'055 because US'474 teaches the irradiation of laser beam could contribute to a decreased threshold voltage required for field emission by the carbon nanotubes (Col.4, Lines 28-38 of US'491).

Regarding claims 2-4, US'055 teaches using thermal CVD (Claim 3) to make carbon nanotube (claim 2) by using iron substrates (claim 4) (Col.6, line 20 to Col.8, line 28 of US'055).

Regarding claims 5-7, US'474 teaches that an excimer laser (claim 6) is used as an irradiating source with a power of each pulse 300 millijoules/cm<sup>2</sup> (claim 5) under a the protection of an ambient gas (claim 6).

Regarding claim 8, US'055 in view US'474 teaches the same process of irradiating with the same laser beam energy on the same entangled nanotube fibers on a substrate as recited in the instant invention (refer to the rejection for the instant claim 1), which would inherently lead to the same effect of reducing the peak current density emitted by the entangled nanotube fibers. MPEP 2112 III&IV. Regarding the peak density measurement in the instant claim, US'055 teaches current density is measured pointed plotted every 40- $\mu$ m interval in both the X and Y directions (Col.3, lines 48-59 of US'055).

### ***Response to Arguments***

Applicant's arguments, see "applicant arguments/remarks", filed 2/29/2008, with respect to the rejections for claims 1-8 under 35 U.S.C. 103(a) have been fully

considered and are persuasive in view of the applicants amendment to the claims. However, upon further consideration, a new ground(s) of rejection is made as addressed above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/Roy King/

Supervisory Patent Examiner, Art Unit 1793